



OFFICE MEMORANDUM

DATE: January 10, 1997

TO: District Engineers
District Field Engineers
District Construction Engineers
Resident/Project Engineers
District Materials Engineers
District Materials Supervisors

FROM: Paul F. Miller
Engineer of Construction

Larry R. Brown
Engineer of Maintenance

James D. Culp
Engineer of Traffic & Safety

Calvin Roberts
Engineer of Materials & Technology

SUBJECT: Joint Construction, Maintenance, Traffic and Safety, and Materials and Technology Instructional Memorandum 1997-C
Interim Procedures for Inspection/Acceptance of Sign Contracts.

The main purpose of this memorandum is to update the process of inspection/acceptance of sign upgrading projects. This process is evolving and will continue to evolve to improve the quality of the Department's signs. It is the intent of the Department to partner with industry and its suppliers to develop a Quality Assurance Program in the area of signing contracts. It is anticipated this program will include new QC/QA type specifications that will include bonus and penalty provisions as a part of signing contracts. Contractors and fabricators will have the major role in quality control in the production and documentation of their work. The Department will be responsible for all aspects of quality assurance. These specifications are in development.

A Special Provision for Traffic Signs has been written for inclusion in contracts with permanent signs. This special provision will be used as an interim specification until the QC/QA sign specification is completed. This provision modifies parts of the 1996 Standard Specifications for Construction in Subsections 810.01, 810.02, 912.04, and 919.02. In addition, a Joint Construction and Materials and Technology Informational Memorandum 1997-B has been developed which has revised testing and documentation

procedures for aluminum sheet used in the fabrication of the Type III and IV signs. Copies of the Special Provision for Traffic Signs and The Joint Construction and Materials and Technology Instructional Memorandum 1997-B are attached.

Joint CIM 1997-C

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This memorandum supersedes Joint Construction Maintenance and Traffic and Safety Instructional Memorandum 1996-C (4-24-96) and Construction Instructional Memorandum 1993-6 (2-1-93). Joint Construction and Materials and Technology Instructional Memorandum 1995-H (8-29-95) and Construction Circular Letter 1995-3 (6-16-95) remain in effect except that references to CIM 1993-6 should be deleted and replaced with this document.

The following procedures shall be used for all sign contracts:

- 1.) The Overhead Sign Shop Supervisor (OSSS) shall be sent notification of all preconstruction meetings scheduled for signing contracts. Notification shall be given as early as possible with the OSSS being placed on the notification mailing list. The OSSS or their representative will discuss possible contract revisions, project reviews, and other information pertaining to the contract.
- 2.) Construction Division employees will be responsible for all construction engineering activities for all types of signing contracts. Detailed daily inspection and documentation activities shall be performed by technicians assigned to the Resident Engineer as the contract work progresses. It is important to find chronic problems early in the contract so they can be dealt with in a timely manner. All functions normally done by construction personnel will continue to be done by construction.
- 3.) Maintenance Division will assist the Resident Engineer as a resource area for technical expertise and training. It is strongly recommended that the Resident Engineer contact the OSSS to review the contractor's progress early in each of the various stages of the contract. During the reviews the OSSS will advise the Resident Engineer of areas of concern on all aspects of the contractor's work. The OSSS will assist in training field personnel in areas of need. All actions taken by the OSSS or their representative, related to an active contract, will be coordinated through the Resident Engineer. It is recommended the Resident Engineer enlist the services of the OSSS as often as needs dictate, especially for overhead sign contracts.
- 4.) A special light source shall not be used in connection with any active sign contract until a Michigan Test Method (MTM) and operating instructions are established. The use of the light will be instituted upon approval of management and completion of the MTM and operating instructions.
- 5.) Final Inspection for acceptance of sign contracts shall be conducted by the Field Engineer or their representative. Input shall be obtained from Traffic and Safety and Maintenance representatives (Lansing and/or District) prior to Final Inspection. Final Inspection will be done on a small random

sample to assure the project is in substantial conformance with the plans and specifications.

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- 6.) The Resident Engineer will draft a single punch list for the contractor's action for acceptance of the project.

These procedures take effect immediately. The Special Provision for Signs will appear in contracts starting in the February 1997 letting.

Engineer of Construction

Engineer of Maintenance

Engineer of Traffic & Safety

Engineer of Materials & Technology

Subject Index: Inspection

Attachments

cc: Lansing Construction Division Engineers
Lansing Construction Division Technicians
POST on Bulletin Board
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M&T Division
Design Division
Maintenance Division
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T. Coleman
American Traffic Safety Services Assn.
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FHWA

MICHIGAN
DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS

**SPECIAL PROVISION
FOR
TRAFFIC SIGNS**

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Description. Subsections 810.01, 810.02, 810.03C, 810.03E, 810.3M, 912.04A, 919.02 (first paragraph) of the 1996 Standard Specifications are hereby deleted and replaced with the following.

810.01 Description.-This work consists of furnishing, fabricating, and erecting traffic control devices specified and according to the Michigan Manual of Uniform Traffic Control Devices.

A. Definitions.-

Alignment.-Orientation of sign face to center of road.

Bolt Hole Wrinkle.-Sheeting wrinkles in the vicinity of a bolt hole.

Bottom Height.-Elevation difference between the bottom of the sign face and the edge of pavement or top of curb.

Brightness.-Measure of reflectivity.

Clean Signs.-Signs without foreign material on the surface.

Dark Spot.-An inconsistency in color or reflectivity.

Defect.-Physical imperfection effecting function, performance or durability of a sign or post. (Dents, Scratch, Nick, Blemish, Mottle, Dark Spot, Scuff, Streaks, Warpage, Sheeting Lift).

Dent.-A depression in a surface.

Embedment.-Depth post is in ground.

Extra Holes.-Holes not used to install the sign.

Fabrication.-Act of producing a product from components.

Field Post Treatment.-Placing of preservative material on untreated surfaces on wood posts in the field.

Font.-Specified letter shape.

Hardware.-Fasteners used to mount signs.

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Installation Location.-Location designated for placement of sign.

Layout.-Sign layout according to Standard Highway Sign Manual or contract provisions.

Level.-In a plane parallel to the horizon.

Mottle.-Mark with blotches of a different color or shade.

Offset.-The distance from the traveled roadway.

Patch.-Reflective sheeting Material used to cover a defect or imperfection.

Plumb.-Vertical, 90 degrees to the horizontal in all directions.

Post Spacing.-Center to center distance between posts.

Printing Streaks.-Inconsistent color from screening process resulting in a narrow mark/band of color.

Saw Cut.-Partial cut of the length, width and depth specified that creates a plane of weakness in a wood post.

Scratches, Nicks, Blemishes, Scuffs.-Defects in sheeting caused by rubbing, scraping or improper handling or transport.

Sheeting Lift.-Sheeting that has separated from the substrate.

Sheeting Splice.-Joining of two pieces of sheeting (butt or overlap) in factory or fabrication shop.

Shim.-Material used to plumb steel column sign supports.

Smooth.-A surface free from roughness, bumps, dents, bends, curves or irregularities.

Splice Indentation.-Impression left from splices in roll sheeting.

Substrate.-Material to which sheeting is applied (wood or aluminum).

Tarring.-Sealing top of wood post sleeves and wedges.

Uniform Reflectivity.-Reflectivity that can be measured to within a given tolerance in all locations.

Warpage.-Deformation caused by bending or twisting in posts or substrate.

Wedge.-Tapered object used to secure wood posts in sleeves.

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Wrinkle.-A furrow or fold in sheeting material.

810.02 Materials.-The materials shall meet the following requirements:

Concrete, Grade P2, P1	601
Concrete, Grade S2	701
Curing Compounds	903
Steel Reinforcement	905
Structural Steel	906
Anchor Bolts and Nuts	908
Electrical Conduit	918
Traffic Control Materials	919

Concrete.-Concrete for cantilever and truss sign support foundation shall be Grade P1 or S2.
Concrete for all other sign support foundations shall be Grade P2.

Structural Steel.-When structural steel is specified for either cantilevers or trusses, the structural steel plants shall be certified by the American Institute of Steel Construction for the Category that applies to Highway Sign Structures.

Aluminum Sheet.-Aluminum sheet will be accepted based upon the provisions of Joint Construction and M&T Instructional Memorandum 1997 - B (Interim Procedure for Acceptance of Aluminum Sheet for Permanent Signs) dated January 10, 1997.

C. Steel Post Sign Supports and Square Tubular Steel Sign Supports.-The posts shall be driven or embedded so that the sign face and supports vary from plumb by not more than 5 mm in 1000 mm.

When driving posts, a method shall be used which will not damage the top of the post. When 9 kg/m posts are called for, the hole shall be pre-augured to the diameter specified and backfilled with concrete.

When embedding 9 kg/m posts in concrete sleeves, forms for the concrete will not be required but the Contractor shall prevent the intrusion of earth within the lines and dimensions shown on the plans.

E. Wood Post Sign Supports.-Wood sign support posts shall be erected so that the sign face and supports vary from plumb by not more than 5 mm in 1000 mm.

M. Signs.-All completed signs shall be reasonably free from defects in materials and workmanship at time of installation. Reflectorized sign faces shall be reasonably smooth and free from dents, wrinkles and other defects. They shall exhibit uniform color and brightness over the entire background surface and shall not appear mottled, streaked, or stained when inspected. The sign shall be free of warpage or other deformation. Signs having improper font and/or legend layout shall be subject to adjustment as determined by the Engineer. Signs with unacceptable wrinkles shall be replaced.

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Patches will be allowed under the following conditions. A maximum of three patches may be permitted per sign. The patch material shall be of the same material used to fabricate the sign. A maximum of 2% of the signs fabricated per job may contain a patch. For projects with 100 signs or less the maximum number of signs with patches allowed will be determined by the Engineer. Patches shall extend ½ inch beyond the outer edges of the defect. The maximum patch size will be determined by the Engineer.

The Contractor shall place a date sticker on the back of all signs at the time of installation.

The following tolerances shall be allowed in the installation of signs and supports.

Hole Spacing: ± 3 mm from dimensions specified.

Extra Holes: maximum of two per sign, extra holes shall be patched on both faces of the sign.

Offset: Offset distance shall be within 650 mm of the location shown on the plans or in the standards but no closer to the traveled roadway.

Bottom Height: Rural ± 150 mm
Urban + 150 mm;-0 mm

Sign Location:

Prior approval of the Engineer must be obtained for location changes for regulatory, gore and no passing zone signs.

± 3 m for advance warning signs. In no case shall the advance warning sign distance be less than the recommended minimum distance set forth in Table 2-1 on page 2C-3 of the MMUTCD or the plans without prior approval of the Engineer.

± 6 m for all other signs.

Post Spacing: measured horizontally at the ground or base.

Steel Post $\pm 2\%$

Wood Post $\pm 3\%$

Gaps between plywood sheets shall not exceed 2 mm.

Unacceptable Wrinkles: Signs with the following wrinkles shall be replaced:

1. A wrinkle that ends at an outside edge of the sign
2. A wrinkle that exceeds 75 mm in length
3. A wrinkle that has split or the sheeting is damaged

Wedges: The upper dimension for wedges shall be 18 mm to 26 mm.

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Signs delivered for use on a project shall be stored as recommended by the reflective sheeting manufacturer. The Contractor shall replace or repair, at the Contractor's expense, any sign that is damaged, discolored, or defaced during fabrication, transportation, storage, or erection. Signs shall be positioned on and fastened to the support. Bolts in contact with reflective sheeting shall be tightened by methods recommended by the reflective sheeting manufacturer. All signs, once erected, shall be clean and free of any substance which would hide or otherwise obscure any portion of the sign face.

Signs erected along a roadway opened to traffic and having a message not immediately applicable, shall have all of the sign message covered until such time as the message is applicable. Signs shall be covered according to Subsection 812.03.F.2 and Special Provisions.

On any project or section of a project open to traffic where existing signs are being replaced by a new sign or signs, the Contractor shall remove each sign being replaced at the same time that the new sign becomes visible to the motorists. The signs and supports that have been replaced shall be removed from the right of way within seven days and as specified in Subsection 810.03.N.

Packaging and protective material used in protecting sign panels shall be completely removed and the Contractor shall perform cleaning of exposed sign face according to manufacturer's specification. If sign construction operations have disturbed the site, leveling and repair may be necessary to ensure the effectiveness and neat appearance of the work. Any excess material shall be removed and disposed of properly. This work shall be done at the Contractor's expense.

912.04 Field Treatment of Preservative Treated Material.-

A. General.-All cuts, saw kerfs, holes, and injuries to the surface of preservative treated material covered by this specification that occur after pressure treatment shall be field-treated. Field treatment shall be done in accordance with all applicable environmental regulations and laws. The Contractor shall take care to ensure that all injuries, such as abrasions and nail and spike holes, are thoroughly saturated with the field-treating solution. Bored holes shall be poured full of preservative. Horizontal holes may be filled by pouring the preservative into the holes with a bent funnel after temporarily plugging the other end of the hole.

Delete the first paragraph of Subsection 919.02 and replace it with the paragraph below. All other portions of Subsection 919.02 remain the same.

919.02 Signs.-Traffic control sign materials shall comply with the following:



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Resident/Project Engineers
District Materials Engineers
District Materials Supervisors

FROM: Paul F. Miller
Engineer of Construction

Calvin Roberts
Engineer of Materials and Technology

SUBJECT: JOINT CONSTRUCTION AND MATERIALS AND TECHNOLOGY . .
INSTRUCTIONAL MEMORANDUM 1997 - B
Interim Procedure for Acceptance of Aluminum Sheet for Permanent Signs

Until further notice, the basis of acceptance for aluminum sheet (blanks) used for fabrication of permanent Type III and IV signs to be installed on MDOT projects shall be tested stock with project-specific verification testing. This interim procedure supersedes the sampling and testing requirements of the Materials Sampling Guide for aluminum sheet. This Joint Instructional Memorandum does not apply to extruded aluminum panel signs.

Sign Fabricator Tested Stock Procedure

The sign fabricator must agree in writing to abide by the tested stock procedures contained in the Materials Quality Assurance Manual (with the exception of Section 3 - Application for Tested Stock Privileges) as modified by the following specific requirements.

- Aluminum blanks used in fabricating permanent signs for use on MDOT projects shall be sampled in the sign fabricator's shop by an MDOT representative at the frequency shown in the table below.
- Copies of mill certifications supplied by the aluminum blank distributor for the material to be placed in tested stock shall be provided by the fabricator at the time the samples are collected. These mill certifications must be submitted with the sample ID.
- All pallets, piles, stacks, etc., of aluminum blanks approved for use on MDOT projects shall be identified by the fabricator in a manner which will reduce the likelihood of fabricating MDOT signs using untested or non-specification blanks.

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- M & T central laboratory personnel will randomly select and test the mechanical properties (tensile strength, thickness, elongation) of 50% of the blanks sampled. Blanks not selected for testing at this point will be held by M & T in case of failing tests.
- Fabricators will receive copies of all test results. The laboratory test report numbers shall be included in the fabricator's inventory records and on all required project documentation.
- All aluminum sheet for permanent Type III and IV signs shipped under this interim procedure shall be documented using Form 1922, "Shipment of Tested Stock Report".

Acceptance Criteria

If all of the first 50 percent of the blanks initially selected by M&T for testing meet specifications, the material will be accepted for use as tested stock.

If any of the first 50 percent of the blanks initially selected for testing fails to meet specifications, the second 50 percent of the blanks will be tested. If any blanks in this second set fail to meet specifications, all test results will be reviewed and a determination will be made as to the need for chemical analysis of the aluminum material. If chemical analysis is required, it will be performed by an independent laboratory selected by M&T.

Once testing is complete, all test results will be evaluated and a determination will be made by M&T to accept or reject the material for use as Tested Stock. If the material is rejected for use as Tested Stock, the fabricator shall describe in writing the steps to be taken to ensure the failed material will not be used on MDOT projects. These actions shall be approved by M&T and a new stock of aluminum blanks shall be tested and approved for use prior to proceeding with fabrication of signs for MDOT projects.

Delay due to the need for additional testing will not be cause for claims for extra compensation by the Contractor.

Sample Size

The sample size will be based on the number of different sizes of aluminum blanks intended to be placed in tested stock as shown in the table below. The MDOT representative will randomly select the specific sizes to be sampled and, for each of those sizes, randomly select one blank for testing. For example, if 30 different size blanks are to be placed in tested stock, four different sizes must be sampled. One blank is then selected at random to represent each of those four sizes.

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Sample Size for Aluminum Sign Blanks	
Number of Blank Sizes	Total Sample Size
<20	2
20-30	4
31-50	6
>50	8

Project Specific Verification Sampling

On all projects which include more than 500 square feet of signs from one fabricator, verification samples will be randomly selected by the Engineer from the project site for testing. If a verification sample fails mechanical tests conducted by the M & T Central Laboratory, chemical composition will be tested at the Contractor's expense by an independent laboratory selected by MDOT. The contractor shall be responsible for replacing the sign selected for verification testing.

Results of this verification testing shall be treated in accordance with Section C-6 (Certification Verification Sampling and Testing - Revised 05/02/94) of the Materials Quality Assurance Manual.

On all projects which include less than 500 square feet of signs from one fabricator, the contractor shall certify in writing that materials meet all materials specifications of the 1996 Standard Specifications for Construction. This certification shall be submitted to the Engineer at the time the signs are installed.

Engineer of Construction

Engineer of Materials and Technology

Subject Index: Inspection
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